CERTIFICATION

I, Yukie KOJO, of 1-2-16 Tennou, Ichinomiya-shi, Aichi-ken, 491-0046, Japan, accompanying certified copy of the documents in respect of an application for a patent filed in Japan on the 28 day of January, 1998 and of the official certificate attached thereto, and certify that the following is a true and correct translation to the best of my knowledge and belief.

Yukie Kojo

Dated this 2 day of May, 2003

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[Document] Abstract 1

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INTERIOR MEMBER FOR AIR BAG AND MANUFACTURE THEREOF

[Scope of Claims for a Patent]

[Claim 1]

A method of manufacturing an interior member for an air bag having an air bag swelling-out port, and a cover body closing this and forming a thin wall portion which is ruptured at a time when the air bag is swollen out, in a part thereof, characterized in that said cover body is formed by a synthetic resin, and thereafter, a main body having the air bag swelling-out port is integrally formed in accordance with a two-color molding by a synthetic resin material which is compatible with said synthetic resin.

[Claim 2]

An interior member for an air bag manufactured in accordance with the manufacturing method as claimed in claim 1, characterized in that a deformation restricting portion which is engaged with a mold face of a forming mold and restricts a deformation of the cover body caused by a molding pressure applied at a time of molding the main body is formed in an outer peripheral edge of said cover body.

[Detailed Description of the Invention]

[0001]

[Technical Field Pertinent to the Invention]

The present invention relates to an interior member for an air bag, and more particularly to a method of manufacturing the same, and a deformation preventing structure of the interior member for the air bag manufactured in accordance with the manufacturing method.

[0002]

[Prior Art]

In recent years, there has been provided an air bag for a front passenger seat and a so-called side air bag for improving a safety, and in this case, the air bag is placed in an inner side of an interior member made of synthetic resin such as an instrument panel, a door trim or the like, and is swollen out into a passenger room from an air bag swelling-out port provided in this interior member. Further, generally, this air bag swelling-out port is closed by a cover body (an air bag cover) having a thin wall portion which is easily ruptured at a time when the air bag is swollen.

[0003]

Since an air bag cover, an instrument panel main body and the like are different in a required mechanical property, the air bag cover has been conventionally made by a separated body from the instrument panel main body and the like, and is attached over an opening edge of the air bag swelling-out port by means of a screw fastening or the like.

[0004]

[Problem to be solved by the Invention]

However, in the case of separately manufacturing the air bag cover, the instrument panel main body and the like, there has been a problem that a lot of labor hour is required for manufacturing and assembling.

[0005]

Accordingly, the present invention solves the problem mentioned above, and one object thereof is to provide a method of manufacturing an interior member for an air bag in which it is not necessary to manufacture an air bag cover and a main body as separate bodies, and a labor hour for

manufacturing and assembling is not required.

[0006]

Further, another object of the present invention is to provide an interior member for an air bag which effectively prevent an air bag cover from being deformed at a time of manufacturing.

[0007]

[Means for Solving Problem]

In order to achieve the objects mentioned above, in accordance with a first aspect of the present invention, there is provided a method of manufacturing an interior member (1) for an air bag having an air bag swelling-out port (12), and a cover body (2) closing this and forming a thin wall portion (24) which is ruptured at a time when the air bag is swollen out, in a part thereof, in which the cover body (2) is formed by a synthetic resin, and thereafter, a main body (11) having the air bag swelling-out port (12) is integrally formed in accordance with a two-color molding by a synthetic resin material which is compatible with the synthetic resin.

[0008]

In accordance with the first aspect of the present invention, since the cover body and the main body having the air bag swelling-out port are integrally formed in accordance with the two-color molding, it is not necessary to manufacture the cover body and the main body as the separate members, and the labor hour for manufacturing and assembling is not required.

[0009]

In accordance with a second aspect of the present invention, there is provided an interior member (1) for an air bag manufactured in accordance with the manufacturing method mentioned above, in which a deformation

restricting portion (22, 25) which is engaged with a mold face (62, 63) of a forming mold (6) and restricts a deformation of the cover body (2) caused by a molding pressure applied at a time of molding the main body is formed in an outer peripheral edge of the cover body (2). As the deformation restricting portion, it is possible to employ a recess portion (22) for forming a thin wall portion (24) which is ruptured at a time when the air bag is swollen.

[0010]

In the second aspect of the present invention, when the main body is formed in the cover body in a solid solution state within the forming mold in accordance with the two-color molding, a great molding pressure is applied to an outer peripheral edge of the cover body. In this case, since the cover body is engaged with the mold face of the forming mold by the deformation restricting portion, the cover body is not deformed even when the molding pressure is applied. This is particularly effective in the case that a soft material is used as a material for the cover body.

[0011]

In this case, reference numerals in parentheses mentioned above show a relation of correspondence to particular means described in embodiments mentioned below.

[0012]

[Mode for Carrying out the Invention]

(First Embodiment)

In Fig. 1, there is shown an enlarged perspective view of a front passenger seat side portion of an instrument panel 1 corresponding to one embodiment of an interior member for an air bag. The instrument panel 1 is made of a polypropylene (PP) corresponding to a thermoplastic hard

synthetic resin material mixed with a rubber or a filler, and an approximately rectangular air bag swelling-out port 12 is formed on an upper face of a main body 11 thereof at a center position in a back and forth direction (an oblique vertical direction in Fig. 1). Further, this air bag swelling-out port 12 is closed by an air bag cover 2 made of a olefin-based thermoplastic elastomer (TPO) integrally formed in accordance with a two-color molding mentioned below. A cross section of the air bag swelling-out port 12 portion is shown in Fig. 2.

[0013]

In Fig. 2, a peripheral edge 13 of the air bag swelling-out port of the instrument panel main body 11 is bent along a lower face of an outer peripheral edge of the air bag cover 2, and is welded to each other. Further, a surface of the air bag swelling-out port peripheral edge 13 of the instrument panel main body 11 is stepwise lowered in an entire periphery thereof, whereby a recess groove 21 is formed with respect to an outer peripheral surface of the air bag cover 2. A rib 23 extending linearly along a front line (a left line in Fig. 2) of the air bag cover 2 and protruding obliquely forward (a left side in Fig. 2) is formed in an inner back face close to the front line, and this rib 23 is covered with a metal retainer 231, and is connected to a bracket 31 of an air bag case 3 positioned at the back of the air bag cover 2 by a bolt 41 and a nut 42. The air bag case 3 in which the air bag is received, is fixed to an insert member 13 of the instrument panel main body 11 via a bracket 32 by a bolt 43 and a nut 44.

[0014]

A recess groove 22 formed in a chevron cross sectional shape in a direction of a front face and recessed deep is formed on a back face along three lines of the air bag cover 2 so as to form a thin wall portion

24 which is ruptured at a time when the air bag is swollen, with respect to the cover front face. Further, a convex strip 25 having a chevron cross sectional shape is formed along remaining one line (a front line) of the air bag cover 2 from both end portions of the rib 23 in continuous with the recess groove 22 mentioned above, thereby forming a deformation restricting portion at a time of a two-color molding mentioned below. In the case that the air bag is swollen, the thin wall portion 24 (Fig. 1) is ruptured along three lines of the air bag cover 2, the air bag cover 2 is left open into a passenger room (the above in Fig. 2) around a portion near a root of the rib 23 corresponding to a hinge center, and the air bag is swollen out from the air bag swelling-out port 12.

[0015]

The instrument panel 1 for the air bag as mentioned above is manufactured in accordance with a two-color molding described below. That is, in Fig. 3, a convex strip 52 having the same shape as that of the recess groove 21 mentioned above is formed on an outer periphery of a mold face in a slide type opposite mold 51 within an upper mold 5, an end face of a slide core 61 within a lower mold 6 comes in press contact with en end face of this convex strip 52, and an air bag cover molding space S1 and a main body molding space S2 in an outer side thereof are separated. Further, a convex strip 62 having a chevron cross sectional shape and a recess groove 63 continuously connected thereto and having a chevron cross sectional shape are formed on the mold face of the lower mold 6 so as to be along an inner side of the slide core 61. The TPO material is injected into the air bag cover molding space S1 mentioned above, whereby the air bag cover 2 is molded, the recess groove 22 (Fig. 2) is molded on a back surface thereof by the convex strip 62 mentioned above, and the convex strip 25

(Fig. 2) is molded by the recess groove 63.

[0016]

During the period that the TPO material within the air bag cover molding space S1 is yet in a semisolid solution state, subsequently as shown in Fig. 4, the slide core 61 is moved backward at a fixed amount, whereby the air bag cover molding space S1 and the main body molding space S2 are communicated. Then, in this state, PP material compatible with the TPO material mentioned above is injected into the main body molding space S2. The PP material fills up the main body molding space S2, enters into a gap space S3 generated by the slide core 61 moving backward so as to form a peripheral edge 13 of the air bag swelling-out port of the main body 11, and is welded to an outer peripheral lower surface of the air bag cover 2 in the semisolid solution state.

[0017]

In this case, as shown in Figs. 5 and 6, in accordance with an inflow (an arrow in each of the drawings) of the PP material into the gap space S3, a great injection pressure is applied to the air bag cover 2 in the semisolid solution state. In particular, as in the present embodiment, in the case that the soft TPO is used for the material of the air bag cover 2, each of the outer peripheral edges of the air bag cover 2 is deformed backward in correspondence to the applied pressure as shown by a chained line in Figs. 5 and 6, and there is a problem that the outer peripheral edge of the air bag cover 2 is deflected from a predetermined shape and is undulated. In this case, in the present embodiment, as already described, since the convex strip 62 and the recess groove 63 are formed on the mold face of the lower mold 6, the recess groove 22 and the convex strip 25 corresponding to the deformation restricting portion are formed on the

back surface (the lower surface in Figs. 5 and 6) of the air bag cover 2 in the semisolid solution state by the convex strip 62 and the recess groove 63, and the recess groove 22 and the convex strip 25 are respectively engaged with the convex strip 62 and the recess groove 63 so as to prevent the outer peripheral edge of the air bag cover 2 from being deformed backward against the injection pressure. In the manner mentioned above, the undulation phenomenon of the outer peripheral edge of the air bag cover 2 can be effectively solved. Further, the recess groove 22 mentioned above not only constitutes the deformation restricting portion for restricting the deformation of the outer peripheral edge in the air bag cover 2 but also has a function of forming the thin wall portion 24 ruptured at a time when the air bag is swollen out in the outer peripheral edge of the air bag cover 2.

[0018]

(Other Embodiments)

In the case of using a hard material such as PPE (polyphenylene ether)/PA (polyamide) alloy and PS (polystyrene) elastomer as the material for the air bag cover 2 in place of the soft material such as the TPO mentioned above, the convex strip 25 corresponding to the deformation restricting portion and the recess groove 63 of the lower mold 6 for forming this are not required.

[0019]

As the material for the instrument panel main body 11, in addition to the PP mentioned above, it is possible to use, for example, a modified PPE in combination with the PPE/PA alloy of the air bag cover 2, for example, PC (polycarbonate)/ABS (acrylonitrile-butadiene-styrene) alloy in combination with the PS elastomer, and the like.

[0020]

The cross sectional shapes of the recess groove 22 and the convex strip 25, and of the convex strip 62 and the recess groove 63 are not always limited to the chevron shape as shown in the first embodiment mentioned above, and may be a cross sectional shape having a surface engaged with the mold face of the metal mold and inhibiting the outer peripheral edge of the air bag cover from being deformed backward. In this case, it is necessary that the cross sectional shape of the recess groove 22 (that is, the convex strip 62) is made in a shape in which the thin wall portion 24 can be formed. Further, it is not necessary that the recess groove 22 and the convex strip 25 are continuously formed on the back surface of the outer peripheral edge of the air bag cover 2, and may be formed discretely with keeping a gap. In this case, in place of the convex strip 25, in the case of employing a recess groove, for example, having the same cross sectional shape as that of the recess groove 22, engaged with the convex strip formed on the mold face of the metal mold, the effect of restricting the deformation can be obtained.

[0021]

[Effect of the Invention]

As described above, in accordance with the method of manufacturing the interior member for the air bag on the basis of the present invention, since it is not necessary to separately manufacture the air bag cover and the main body, a lot of labor hour for manufacturing and assembling is not required. Further, in accordance with the interior member for the air bag on the basis of the present invention, since it is possible to effectively prevent the air bag cover from being deformed at a time of manufacturing, an appearance is improved.

[Brief Description of the Drawings]

[Fig. 1]

Fig. 1 is an enlarged perspective view of a front passenger seat side portion of an instrument panel for an air bag in accordance with one embodiment of the present invention.

[Fig. 2]

Fig. 2 is a cross sectional view along a line II-II in Fig. 1.

[Fig. 3]

Fig. 3 is a cross sectional view of a metal mold at a time of molding the instrument panel for the air bag.

[Fig. 4]

Fig. 4 is a cross sectional view of the metal mold at a time of molding the instrument panel for the air bag.

[Fig. 5]

Fig. 5 is a cross sectional view of a main portion of the metal mold at a time of molding the instrument panel for the air bag.

[Fig. 6]

Fig. 6 is a cross sectional view of a main portion of the metal mold at a time of molding the instrument panel for the air bag.

[Description of Reference Numerals]

1 ... instrument panel for air bag,

11 ... instrument panel main body,

12 ... air bag swelling-out port,

2 ... air bag cover,

22 ... recess groove,

25 ... convex strip,

6 ... lower mold,

62 ... convex strip,

63 ... recess groove.

Abstract

[Problem To Be Solved]

It is not necessary to manufacture an air bag cover and a main body as separate bodies, and a labor hour for manufacturing and assembling is not required.

[Solution]

An instrument panel 1 for an air bag having an air bag swelling-out port 12 and an air bag cover 2 closing this. The air bag cover 2 is formed by a olefin-based thermoplastic elastomer (TPO), and thereafter, a main body 11 having the air bag swelling-out port 12 is integrally formed in accordance with a two-color molding by a polypropylene (PP) which is compatible with TPO.